Senior Thesis

GEOSCAPE ONE

... planning

The Ohio State University's

Geologic Park

by:
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THE OHIO STATE UNIVERSITY

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COLUMBUS, OHIO

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Department of Geological Sciences

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ABSTRACT

GEOSCAPE ONE: PLANNING OSU'S GEOLOGIC PARK

The proposed project will provide an on-campus setting of outcrops and materials for efficient, multilevel teaching and learning of geoscien ce fieldwork fundamentals. Field investigations are essential for the geosciences; however, few campuses have access to the variety of outcrops needed for mapping exercises. The outdoor laboratory will consist of 0.5 to 2.5 meter specimens in a 110 by 400 meter area that will provide non-exclusive use adjacent to our classrooms. The geology will fit the topographic variability (scarp, grotto, valley, and pond). The installation will be aesthetically pleasing, fit with and enhance the existing topography and landscape, and provide for scientific study of geologic materials, processes, structures, and history.

The type and difficulty of an exercise will vary with the level of student and will include 1) pace and compass and GPS-based topographic mapping, 2) identification of rock types and fossils, 3) aerial photo and computer-based mapping, 4) geologic mapping, with a range of complex structures and intrusions, 5) interpretation of facies, paleo-environments, and geologic history. Wells and subsurface masses (iron and plastics) and sedimentary layers are being considered for geophysical and hydrologic investigations. The project will incorporate rocks from the pre-Cambrian, Paleozoic, and Quaternary terrains.

Steps in planning and building such a site include: approval of the concept, selection of geologic concepts and techniques, design of field problems, design of outcrop installations, development of construction documents, preparation of drawings, and solicitation of support and specimens. GEOSCAPE ONE is an extension of the typical geologic rock garden on many campuses and GSA's proposed Colorado Rock Park Project (GSA, 1996). With attention to aesthetics, it will be an educational "rock-art park", too.

INTRODUCTION

Field study is a primary component of geological education. Many colleges and universities have a range of outdoor exercises that include such activities as identification of rocks and minerals in campus building stones, interpretation of landscapes and geologic structures on field trips, and completion of detailed geologic maps at geologic field stations. To reach more students in geology courses for general education studies and to better prepare geology majors for intensive, summer field mapping courses, some colleges have developed collections of boulder-sized specimens for study on campus. Currently, The Ohio State University has several campus field trips that incorporate landscape boulders, building stones, a geological rock garden, and museum displays.

Expansion of the geological field activities on campus has been proposed to improve geological understanding by pre-college, undergraduate, and graduate students. In the early 1990's, an outdoor geoscience laboratory, located adjacent to the two geoscience buildings on The Ohio State University (fig.1), was proposed by several faculty members. The primary objective of such a laboratory is to provide rock identification, field mapping, landscape and structural interpretation, hydrological analysis, and subsurface geophysical interpretation. A secondary objective for this public space is to provide aesthetically pleasing geologic installations and interpretive sites. As the Geosciences will not have exclusive use of the site, the scientific installations should accentuate the "geo-art" component when appropriate. This objective builds on the geo-art reflected in Orton Hall and Mendenhall Laboratory. The working name for the outdoor laboratory, with its public art component, is GEOSCAPE ONE.

The purpose of this study is to: 1) create and organize ideas for GEOSCAPE ONE, 2) cultivate the geologic thought behind the development, 3) detail construction aspects and problems, 4) solicit creative design assistance, 5) prepare site and spatial analysis data, 6) develop aesthetic designs for the site, 7) research feasibility and geologic continuity, 8) increase positive public awareness toward GEOSCAPE ONE and geologic education, 9) research similar projects, and 10)

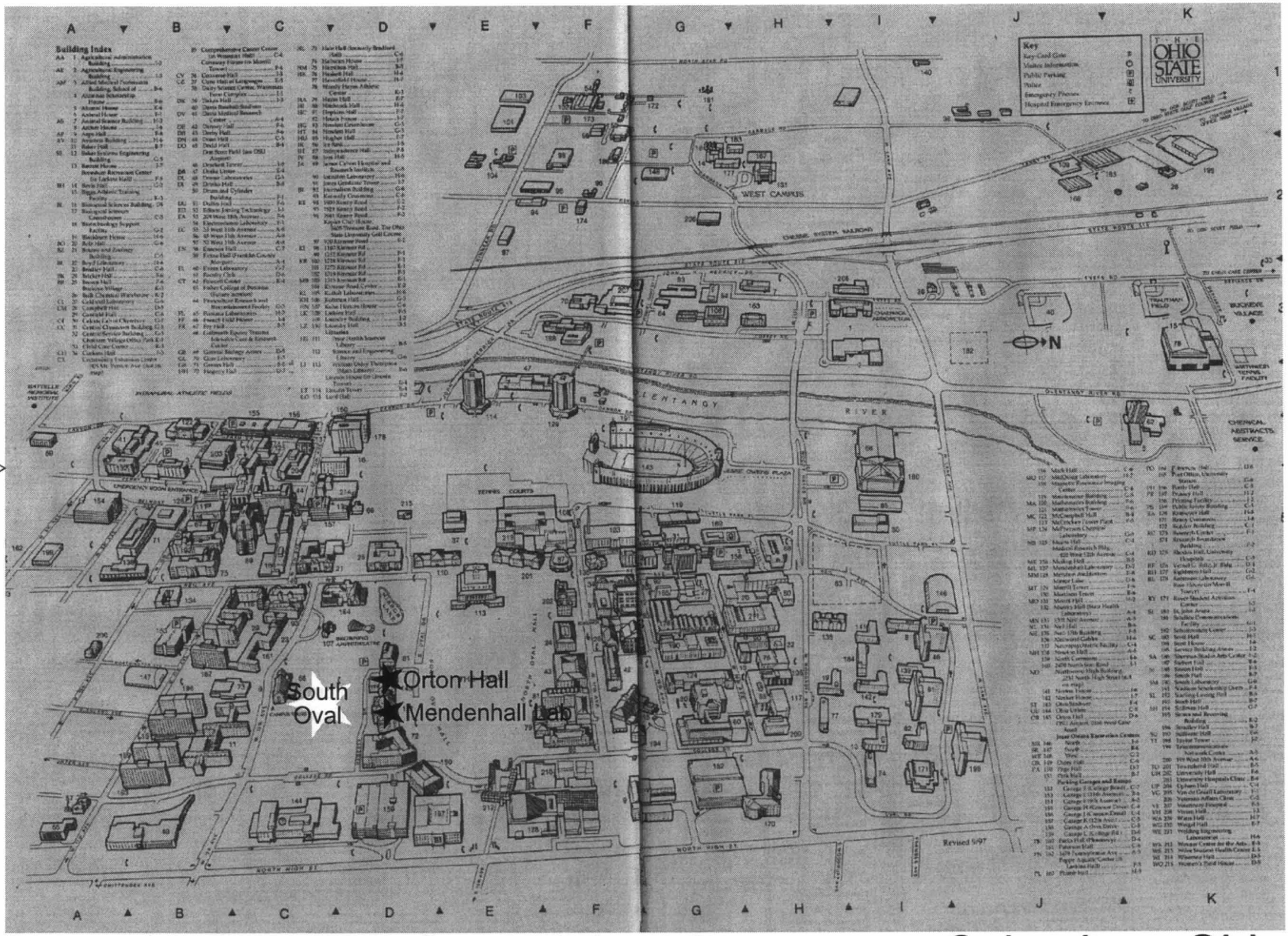


figure 1 - The Ohio State University campus, Columbus, Ohio

awareness toward GEOSCAPE ONE and geologic education, 9) research similar projects, and 10) find potential sources for funding and donations.

As detailed in the abstract, GEOSCAPE ONE is designed to be a multilevel, outdoor laboratory to be used as a teaching aid in the geosciences. Exercises will be based on the skill-level of the student. GEOSCAPE ONE is not meant to replace field trips, field station experience, or classroom laboratories. Exercises in this outdoor laboratory will be used in conjunction with these activities to clarify geologic terminology and problems, to provide access to field processes and techniques in a controlled setting, and to hone quantitative and spatial reasoning skills. Most university campuses do not have ready access to outcrops for field study. In this environment, students will be able to work on their data gathering techniques in preparation for actual field work. The outdoor laboratory will give more students the experience of working with a variety of problems using full-scale outcrops located on-campus. Travel time and expenses will be saved while learning the basics of field study with the constructed outcrops.

The Site

The site for the proposed outdoor laboratory or geologic park is on the campus of The Ohio State University in Columbus, Ohio. It is in the area known as the South Oval (fig.3). The South Oval is in a gently sloping, grassed and treed ravine. At the western edge of this hollow is Mirror Lake and Neil Avenue. Mirror Lake (fig.2), an icon at Ohio State, provides a site for quiet relaxation and reflection. The site is bound by College Avenue to the east and Twelfth Avenue to the south. The north side of the site, home to the Department of Geological Sciences, contains some of the most interesting geological and architectural buildings on campus. Orton Hall, named for Ohio State's first president and Ohio's first State Geologist, preserves Ohio's geological history in its Richardson Romanesque Revival Style architecture. Mendenhall Laboratory, recently renovated, contains rock sculptures throughout and an entryway that captures the imagination of artist and geologist with its spiral floor inlay. The character and geologic significance of these buildings can be reflected in the design and installation of GEOSCAPE ONE.

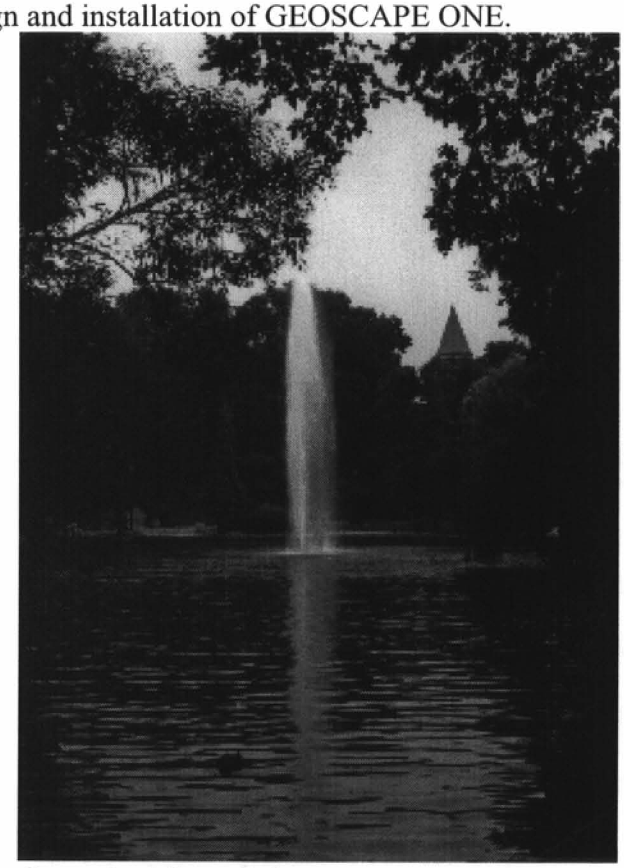
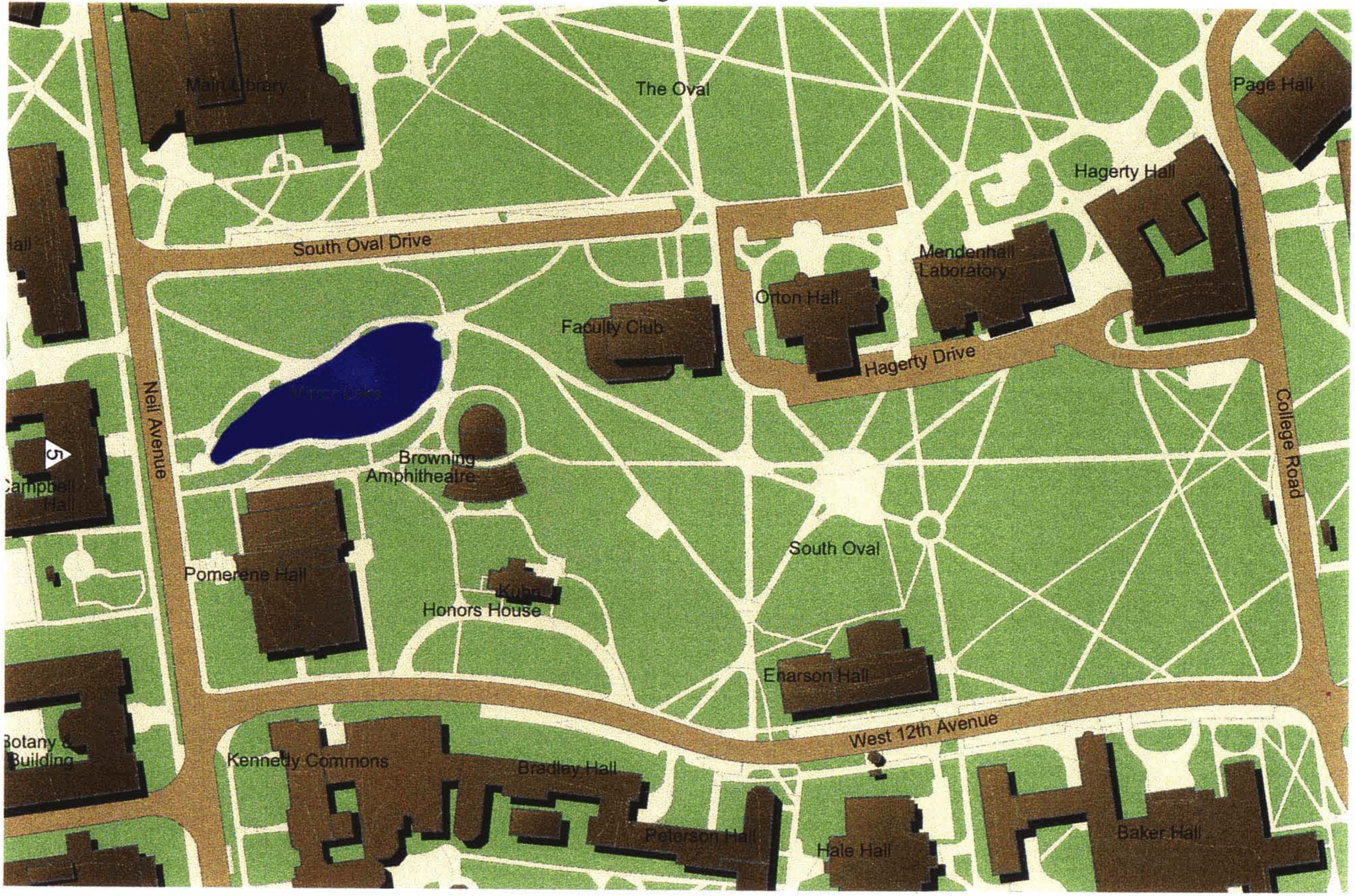


figure 2 - Mirror Lake

MAP OF SOUTH OVAL

figure 2



Plans for the Site

The South Oval provides an aesthetically pleasing setting for the geologic exercises and is adjacent to the indoor classrooms and laboratories of the Department of Geological Sciences (Orton Hall and Mendenhall Laboratory). While the goal of the park is to provide an area for geologic study, it should fit the existing topography, enhance the natural landscapes, provide easy access to the outcrops, and not disrupt the pedestrian traffic (fig.4) and everyday activities on the South Oval.

Field investigations are essential for the geosciences. However, few campuses actually have access to the variety of outcrops needed for mapping exercises. The proposed method of showing geologic structures is by strategic location of rocks around the South Oval. Permanently fixed, constructed outcrops (fig.5) will be selected for rock and mineral identification, environmental interpretation, and structural analysis with the goal of producing a geologic map and cross-section by students.

The outcrops will vary in size, shape, rock type, and purpose. Some outcrops will be large enough to take a variety of measurements, while others will merely provide rock type and mineral content information. By selecting different rock outcrops with different lithologies and/or attitudes, many geological mapping structures and interpretations will be available to students. In some exercises, it may be possible to incorporate temporary, mobile outcrops that contain special or rare materials.

Additionally, each outcrop can be used for general geologic study: mineralogy, petrology, sedimentology, stratigraphy, structural geology, and other related disciplines of geoscience.

figure 4 - Pedestrian Traffic

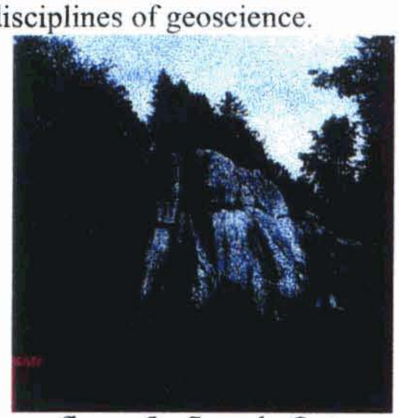


figure 5 - Sample Outcrop

Use of the Park

GEOSCAPE ONE is generally designed to meet the needs for geology and other geoscience students as a means of understanding field methods before actually entering the field. However, the park is not to be used exclusively by these departments. The laboratory exercises offered by GEOSCAPE ONE can be used on a number of different academic levels and through numerous curricula. For example, Environmental Science, Engineering, Natural Resources, and Landscape Architecture students would benefit from the mapping and geologic materials exercises.

In addition to the many academic prospects, GEOSCAPE ONE offers many attractive alternatives to the public. Not only will the park be enjoyable to walk through because of spectacular rock outcrops and scenic views, but a geologic time scale, stratigraphic columns, and other geologic information will be available to further the experience.

Programs available through The Ohio State University for elementary and high school students and teachers will utilize the park for earth science lessons. *Geology 101 for Kids* is one such program that brings students, and in the future, teachers to the University to study earth materials and science in classrooms and laboratories. GEOSCAPE ONE could also easily be incorporated in the *Science Olympiad*, an annual state-wide competition for pre-college students.

Many of the geologic activities in the park will be available to the public throughout the year. Professional geologists, geology students, pre-college classes, and the public will be able to explore the geologic sites on their own. Informal education will be a design component of this project.

Funding

The funding for GEOSCAPE ONE will be derived mainly from private donations and allowances from the University. The Department of Geological Sciences, alumni, faculty, and businesses will be asked for donations of time, money, and/or materials. Other possible funding may come from donations of rocks, bricks, and other materials. GEOSCAPE ONE will provide opportunities for named donor pieces.

Similar Rock Parks

GEOSCAPE ONE will be a unique venture. A project of this magnitude and scope has yet to be successfully completed. The Ohio State University would have a "centerpiece" for geological sciences that would attract a wide range of visitors.

There are other assemblages of stones found in Ohio and nationally but they lack the complexity and utility proposed by GEOSCAPE ONE. For example, the Ohio Department of Natural Resources (Fountain Square offices) has a wetlands which shows geologic material of Ohio and a geologic column that was dedicated on Earth Day 1990 (OGS, 1990). In Colorado, a rock park is planned for the Geological Society of America's headquarters. The *Colorado Rock Park Project* will exhibit the geology of Colorado and will assemble a representative sample of real rocks and fossils and place them in a spatial context (GSA, 1996). On the campus of the University of North Carolina at Chapel Hill, the *Walter A. Wheeler Rock Garden* was built in honor of the late professor (Roberson, 1997). A similar park is located at the University of Waterloo (UW, 19--). This site contains a large variety of rocks of all types and has been incorporated into their laboratory exercises but does not utilize them in complex geologic mapping exercises.

It is easy to see the need for such a park. If the Ohio State University accepts the plan for GEOSCAPE ONE , it would be the first such park of its kind. Ohio State's geologic park could be the model for universities worldwide.

FIELD ACTIVITIES IN GEOSCAPE ONE

Geology, as defined by the *American Heritage Dictionary*, is the scientific study of the origin, history, and structure of the earth. Geology is generally divided into two categories: physical and historical geology. Physical geology examines the materials composing the earth and seeks to understand the many processes that operate beneath and upon its surface. Historical geology seeks to understand the origin of the earth and its development through time. Thus, it strives to establish an orderly chronological arrangement of the multitude of physical and biological changes that have occurred in the geologic past (Tarbuck,1993, p. 2).

As outlined in the introduction, GEOSCAPE ONE (fig.6) will essentially be an obstacle course for geologists and geoscience students. It will take knowledge learned in the classroom about historical and physical geology and the dynamic earth and apply it in practical, topical field experiences. The skill level of the exercises will be based on the geologic abilities of the student. The exercises will range from simple application of scientific method to in-depth analysis of geologic materials and landscape for geologic mapping.

South Oval

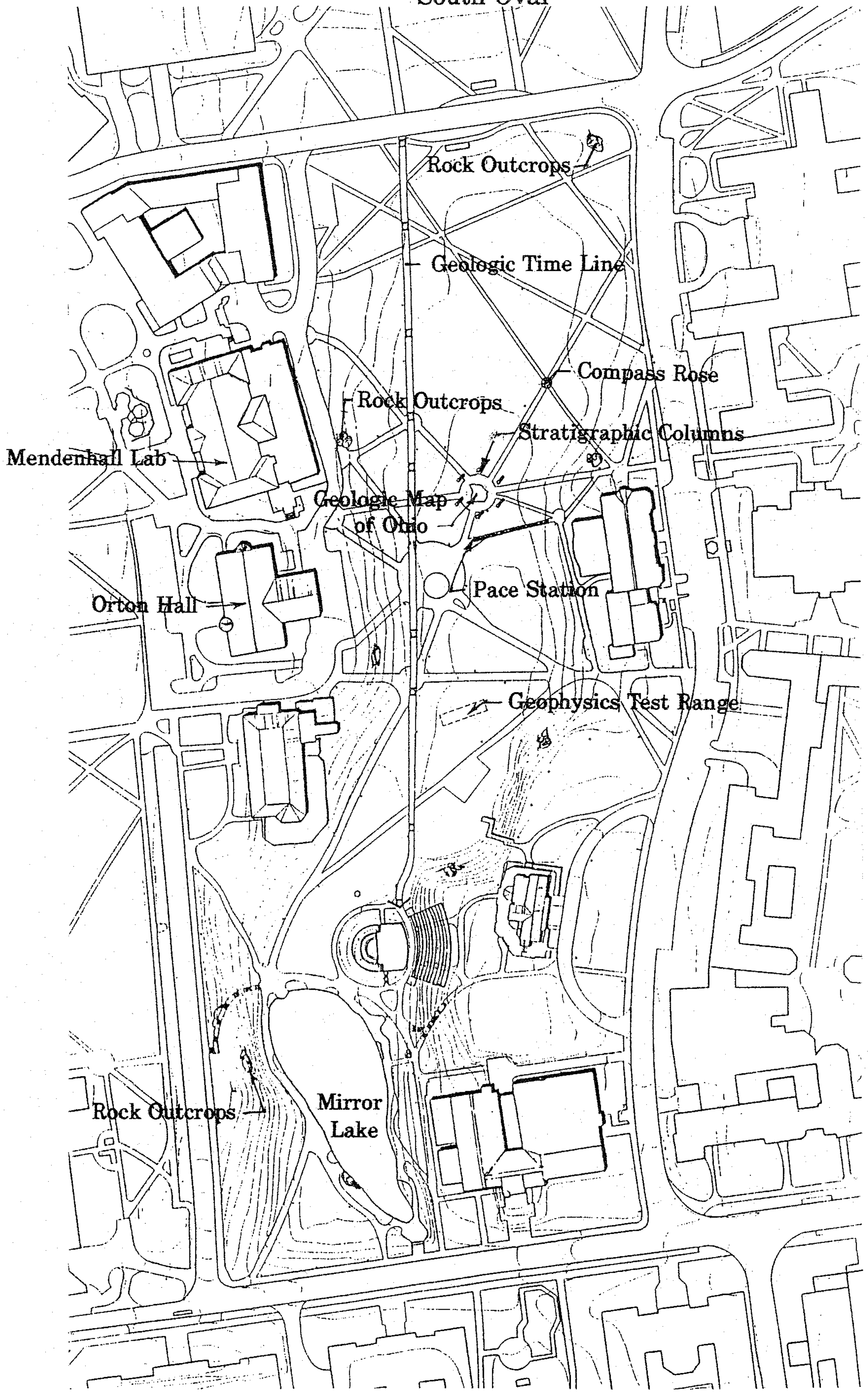


figure 6 - Site Plan

Identification of Rocks and Minerals

As in any geoscience, the essence of geology is based on observation. The first step in identification of a rock begins with mineral recognition (fig.7) and a rock description. Every rock has a story to tell and it is our job, as geologists, to read it.

figure 7 - Rock Identification

A mineral is defined as a naturally-occurring inorganic solid that possesses an orderly internal structure and a definite chemical composition (Tarbuck, 1993, p. 28). Each mineral has a unique set of physical properties that are diagnostic features of that mineral. Tests of a mineral's cleavage (fig.8) (described by the number of planes exhibited by the mineral and the angles at which they meet), hardness (based on Moh's hardness scale), streak (color of mineral in powdered form), luster (metallic, pearly, silky, resinous, dull, etc.), color, specific gravity (ratio of the weight of the mineral to the weight of an equal volume of water), crystal shape (external expression that reflects internal arrangement of atoms), tenacity (amount of resistance) and other properties can be performed on specific outcrops in the proposed geologic park in conjunction with classroom laboratory studies.

A rock is defined as an accumulation of one or more minerals in which the properties of the minerals are retained. Rocks can be classified into three categories: igneous, metamorphic, and sedimentary. Igneous rocks are based on igneous texture (phaneritic, aphanitic, porphyritic, glassy, etc.), mineral composition (based on the crystallizing temperature and Bowen's reaction series), and rock origin (extrusive or volcanic, and intrusive or plutonic). Metamorphic rocks are based primarily on texture (foliated or non-foliated), mineral composition, facies grade, and type of metamorphism (contact, regional, shock, etc.). Sedimentary rocks are classified mainly on grain size (sand, silt, clay, etc.), composition, physical properties, and origin (source rock). Field tests can be performed at selected outcrops in the geologic park to determine rock type. Specific characteristics of the rocks can be used to identify and name it.

From the rock and mineral data, a rock description can be made at each outcrop. In a field notebook, detailed information about the outcrop is made in an organized, orderly manner. Rock type, crystalline or sedimentary, color of rock on weathered and unweathered surface, bedding thickness, grain size, geologic structures, fossils, lateral and vertical variations in lithology, formation contacts, and any geopetal features should be noted. Some of these features may be present and some may only apply to sedimentary rocks. Geographical features, sedimentary structures, such as graded and cross bedding, and other information that will aid in defining structural and formational features. It is also helpful to diagram any important data. A picture is worth a thousand words.

Thin sections of each rock outcrop could be produced for advanced studies in mineralogy, petrology, and structural geology. Each outcrop could be analyzed for their optical properties, as well as, their stress histories.

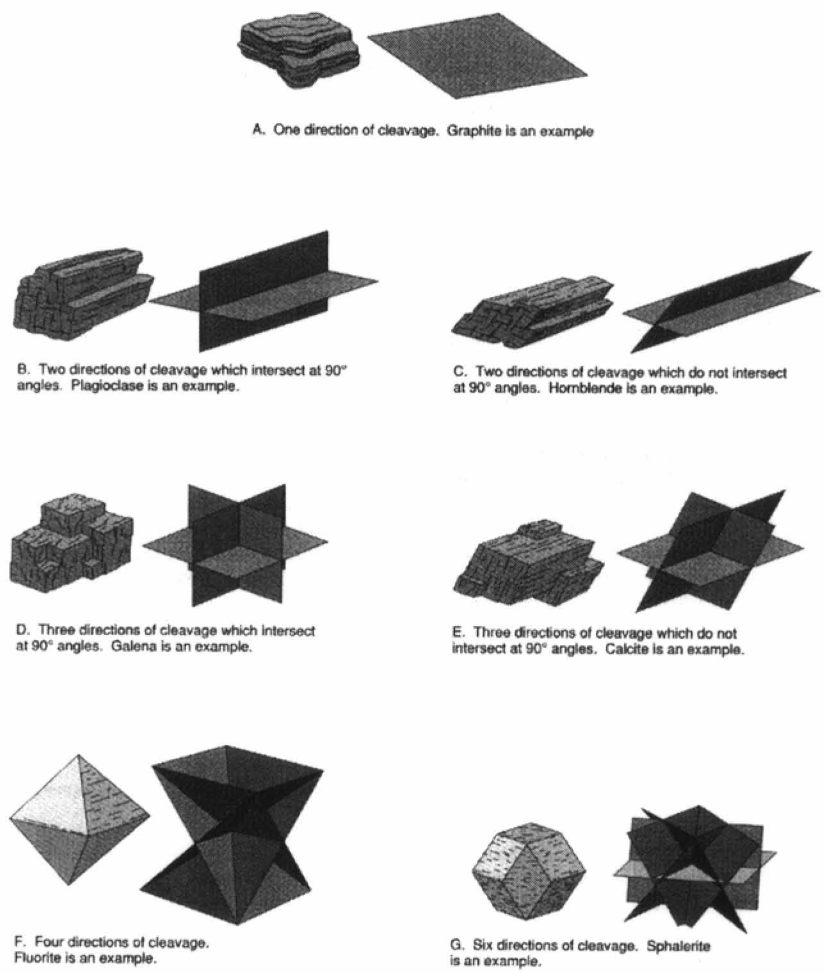


figure 8 - Mineral Cleavages

Topographic Mapping

Topographic maps are valuable tools for geologists. They are used as base maps to record geologic data and to study physiographic features of an area. The relief (fig.9) of a topographic map can be better understood by drawing a geographic profile.

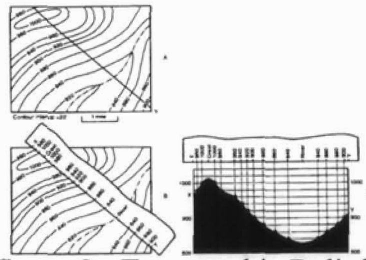


figure 9 - Topographic Relief

As a complimentary exercise to classroom laboratory, topographic maps of the proposed geologic park can be made using a plane table (fig.10) and alidade or a hand-level and a tape measure. Each student will be given a plan-view map (without contours) of the area. Each group will be responsible for mapping a contour interval on the site. By marking the contour spots with flags, students will physically be able to see the contour taking shape across the landscape. The map of the site begins to take shape as each spot is measured and plotted in position on the plan-view map. The maps from each group can then be combined to represent the total relief on the site. Profiles of the site can be taken through different sections using the students' maps. A more intense laboratory study of the area may be completed with a transit, laser level, or Global Positioning Satellite (GPS) (fig.11) receiver in more advanced classes.

figure 10 - Plane Table Mapping

figure 11 - GPS Unit

The Browning Amphitheatre (fig.3) provides an excellent location for measurements of relief and inclination. The outdoor theatre, on the site of GEOSCAPE ONE, is built into the existing landscape. By building a human ladder (fig.12) up the slope of the amphitheatre, the trend and inclination of this line of people can be measured. The trend is determined by projecting both the "foot" of the ladder and the "head" of the ladder vertically upward into a common horizontal plane, and connecting these points of projection. The azimuth of this line is measured with a compass. The inclination of the human ladder is the angle between the line of bodies and the horizon, as measured in a vertical plane (Davis, 1996, p. 663).

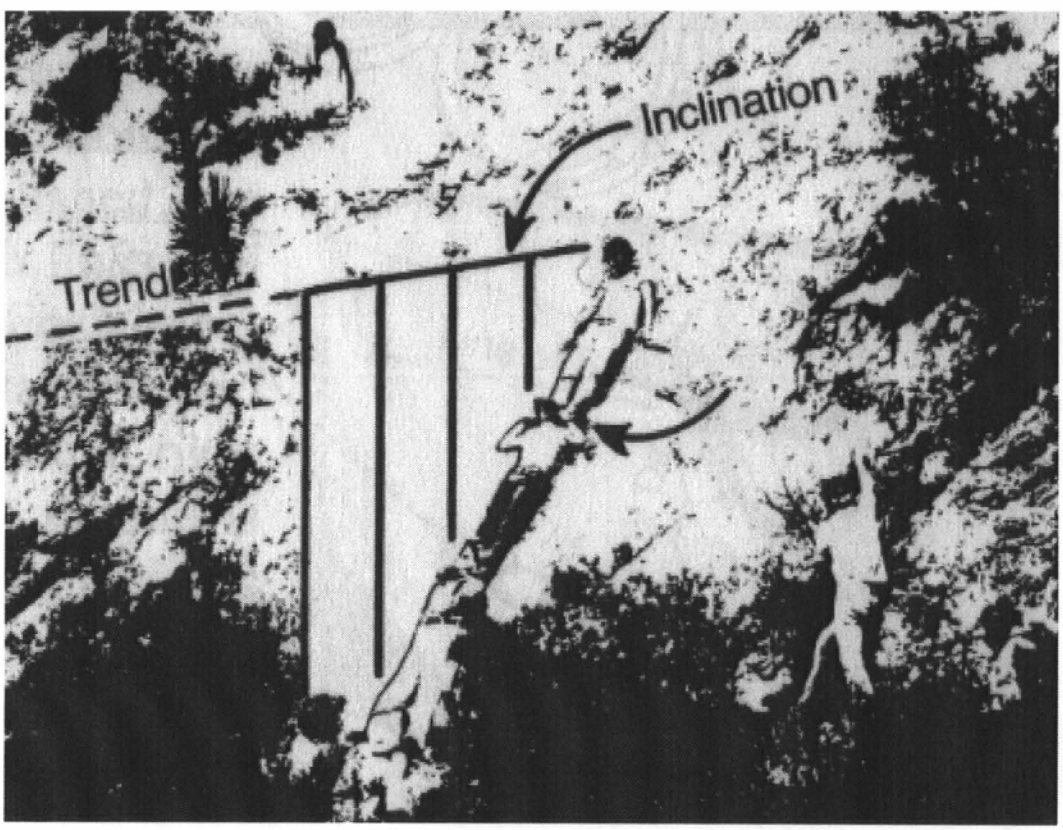


figure 12 - Human Ladder

Pace and Compass Mapping

Pace and compass mapping is an effective field method that can be used when more sophisticated mapping methods are unavailable. This is a laboratory exercise that will be used to allow the student to become familiar with the *Brunton compass* and basic mapping skills. By using a *Brunton compass* and taking detailed, orderly field notes, a complex map can be made. On the proposed site, students will be asked to make a plan-view map, to scale, of some of the buildings on the South Oval (fig.13).

There will be several stations that the student must go through in order to begin mapping. A pace station will allow the student to set their pace using a set distance of one hundred feet (number of steps per one hundred feet is their pace). A compass rose is planned as an inlaid plaque in the sidewalk and will provide a visual guide to the direction of true north. There will be an area provided to set the magnetic declination in either an inlaid plaque or stone. To show the many functions of the *Brunton compass*, strikes and dips can be taken and plotted on the base map at permanently set checkpoints.

After successful completion of these stations, the student is ready to begin mapping. From stakes placed on the site, a distance and bearing can be taken. Once the stakes are mapped on the site, measurements to the buildings are taken from the stakes. By triangulation, the buildings can be placed in their proper place on the site map. Additional exercises may include the use of GPS to complete this same map.

figure 13 - Pace and Compass Map, with Compass Rose and Pace Station

Geologic Mapping

Geologic mapping is an essential part of a geology student's coursework. It is one of the most difficult and challenging subjects to understand. In most cases, a student is unable to grasp the concepts until being thrust into the field. While nothing can take the place of actual field study, GEOSCAPE ONE will enable the student to experience field processes and mapping problems in a controlled setting prior to field trips.

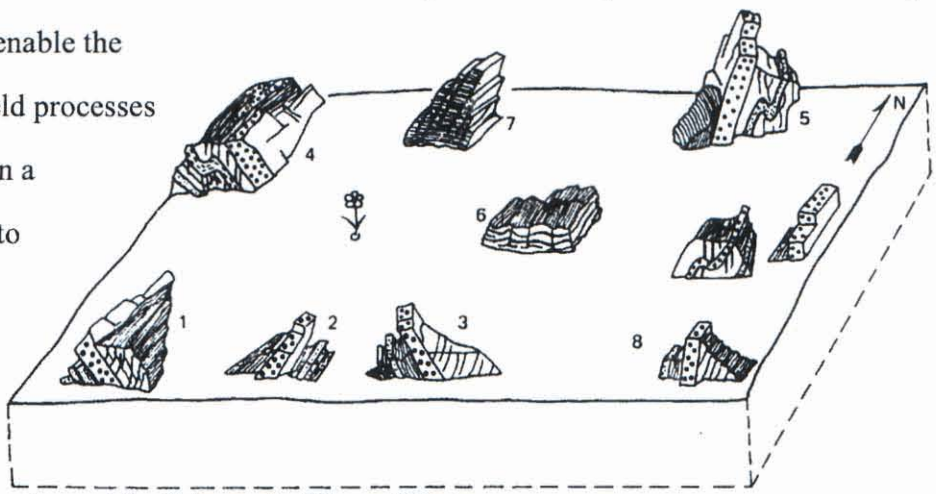


figure 14 - Schematic View of Outcrops

Because of the lack of existing outcrops on The Ohio State campus, the method proposed to show geologic structures is by strategic location of rock outcrops (fig.14) around the South Oval. From permanently fixed, constructed outcrops and by the selection of specific rock types, a geologic map (fig.15) can be reproduced by the students. By using a varied selection of rock types, many different structures and geologic mapping problems will be available for study.

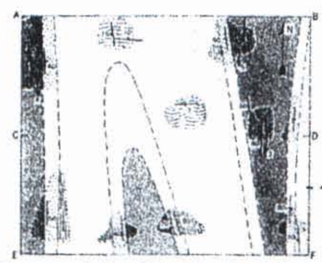


figure 15 - Geologic Map from Schematic Outcrops


figure 16 - Possible Outcrops

The constructed outcrops (fig.16) will vary in size, shape, rock type, and purpose. Some will be large enough to take a variety of measurements, while others will merely define rock type, mineral composition, and/or geologic contact.

Strike and dip are measurements (fig.17) required to define the orientation of a plane in space. Strike is the trend of a horizontal line in a plane. The dip of a plane is the angle of the line of steepest inclination (which is always perpendicular to strike) on that plane.

figure 17 - Students Taking Strike & Dip Measurements

Taken together, strike and dip can define the orientation of a bedding plane in space, and thereby, help define the geologic structure.

Geologic contacts can be shown in numerous ways. The directions for the exercises may state where several contacts are located. Some outcrops may show the actual contact by placing several specimens adjacent to each other. Contacts may be implied or estimated by relative ages of the rocks. Some strikes and dips may also be supplied depending upon the type of exercise chosen for the lab.

By using basic principals of geology, such as relative dating, the Law of Superposition, the Law of Original Horizontality, the Doctrine of Uniformitarianism, the Principal of Faunal Succession, the Law of Cross-Cutting Relationships, and other "Laws", important information about the geologic structure can be deduced.

Common symbols (fig.18) used in geologic mapping can be found in the *American Geological Institute's* AGI Data Sheets (AGI, 1989). It is important to be consistent and use a standardized format of symbols to avoid any confusion.

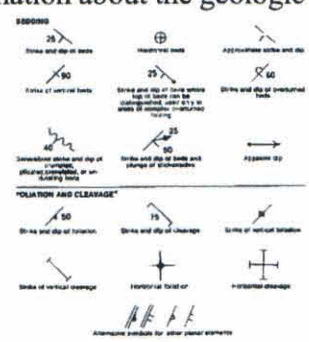


figure 18 - AGI Symbols

One of the purposes of this study was to use the existing landscape of the site to create possible geologic mapping problems. It will be from these maps that the placement of rocks and geologic features will be shown. Some of the outcrops will be very complex and will contain a wide variety of geologic features and rock types to ensure multiple usage at each outcrop.

A sample geologic map (fig.19) provided, as a possible mapping exercises for GEOSCAPE ONE, shows two intrusive dikes that have cross-cut each other. The rocks have baked or metamorphosed the pre-existing rocks. One of the dikes has been truncated by a left lateral strike slip fault. Typical topographic features representative of a fault (Mirror Lake = sag pond, steep slopes on the South Oval = fault scarp) may be seen. Using selected outcrops, this geologic map and generalized cross-section (fig.20) can be reproduced by the student.

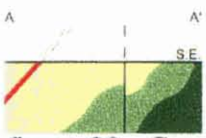


figure 20 - Generalized Cross-Section

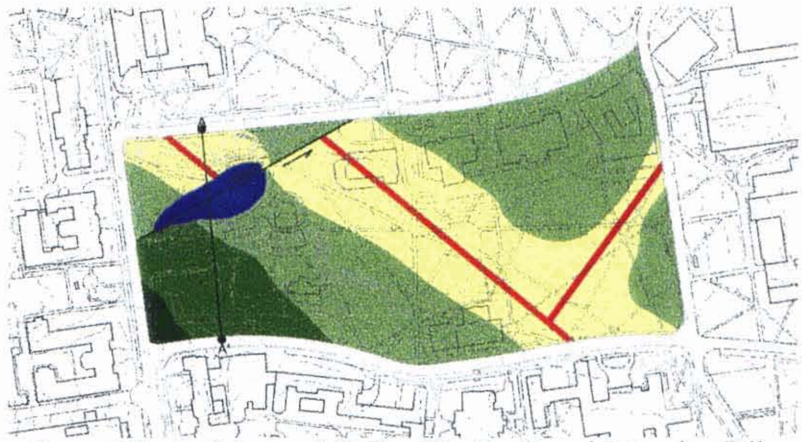


figure 19 - Left Lateral Strike Slip Fault and Intrusive Dikes

An additional map (fig.21) represents a window structure found in low angle thrust sheet systems. The rocks selected will show an erosional feature that exposes basement rocks through the window. Using the topography and some clues to the geologic setting of this system, a geologic map and generalized cross-section (fig.22) can be produced by the student.

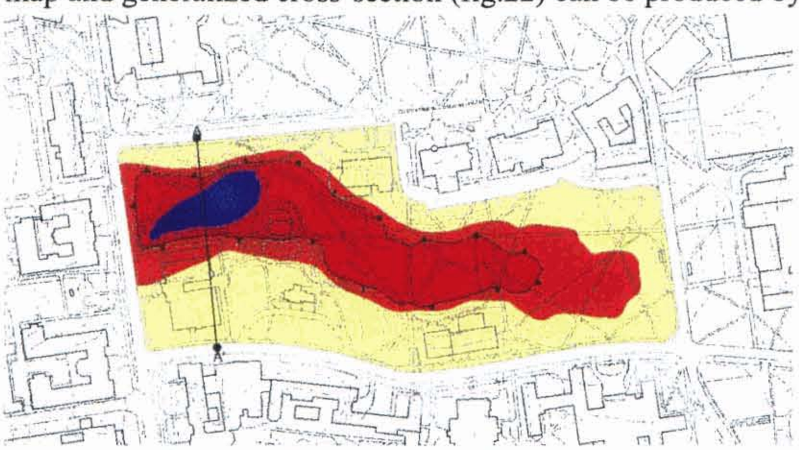


figure 21 - Thrust Fault and Exposed Window

figure 22 - Generalized Cross-Section

Another option that may be entertained is a map that resembles the geologic map (fig.23) of Ohio. The rocks used in the map area would be local rocks from each region. The Cincinnat-Findley arch system (fig.24) would be reproduced.

figure 24 - Generalized
Cross-Section

figure 23 - Plunging Anticline

An important job of a geologist is determining the direction of the top of beds. If the top is incorrectly diagnosed, the entire structure will be inverted. The geologic map (fig.25) to be produced in this example is a syncline with one of its limbs overturned. Using strike and dip measurements and geopetal features, the correct structure (fig.26) and geologic map can be produced by the student.

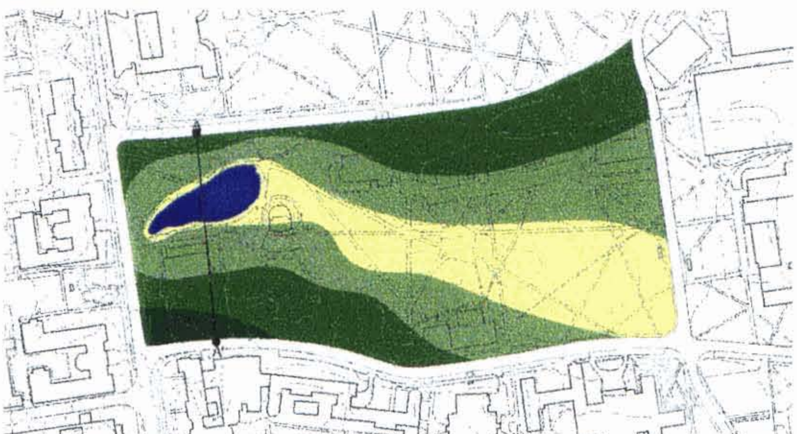


figure 25 - Overturned Syncline

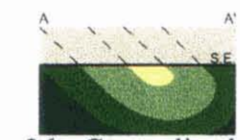


figure 26 - Generalized
Cross-Section

More examples will be developed as the design phase progresses.

Subsurface Sites

To provide a comprehensive field experience in the Geosciences, exploration of the subsurface materials and hydrology is essential. The GEOSCAPE ONE site includes a subsurface site for non-exclusive use of geophysical and hydrological outdoor laboratory exercises.

Depending on the restrictions presented by the cultural components of the surface and subsurface, the site should be nearly horizontal but drained by the topography. It should avoid steep slopes and public walkways. However, the site must accommodate a small All Terrain Vehicle (ATV) and a small truck to transport geophysical equipment and be large enough for several "stations" for making geophysical measurements. For hydrologic pumping tests, access to electricity would be practical, but not necessary.

figure 27 - Ground Penetrating Radar

Environmental Geophysics Test Range

Objectives of geophysical exercises are to interpret stratigraphy and buried masses by ground penetrating radar (GPR) (fig.27), magnetic, electrical, and seismic methods. Sketches provide possible configurations with depths of buried masses, their materials, and the stratigraphy.

For borehole geophysics and hydrologic studies, two PVC-cased, 6 inch diameter boreholes will be used. Other wells, some to bedrock, will support groundwater measurements and pumping tests. For geophysical research on buried masses, the water wells also will provide water-table data and could control water levels during geophysical measurements.

Buried Masses

Buried masses (fig.28) will be set in gravel, sand, or a till/clay mixture. Shallow burial will be two to three feet. Deep Burial will be six to eight feet. Horizontal continuity of stratigraphy will extend two or three times the depth of the buried mass. Depending on mass size and depth, masses will be separated by about fifteen feet to minimize interference.

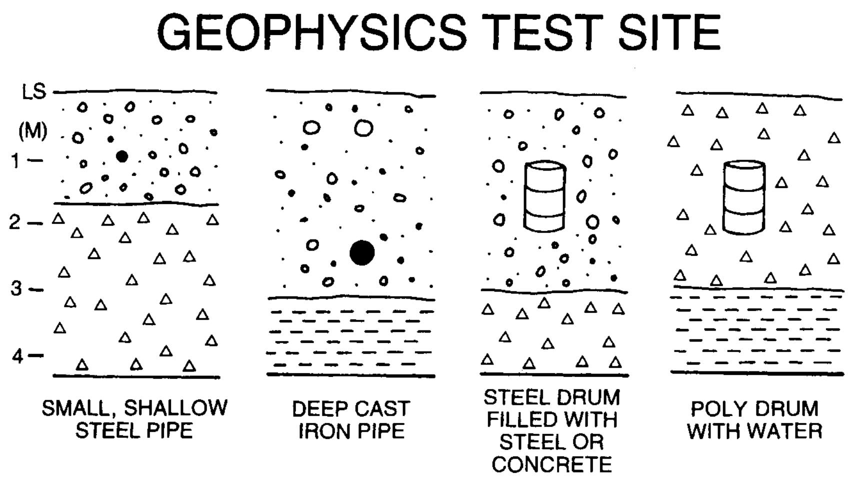


figure 28 - Proposed Environmental Geophysics Test Range

Buried materials and shapes:

Concrete-filled plastic barrel (50 gallon or 20 gallon)

Steel wrecking ball (2-3 feet in diameter)

Water-filled polyethylene tank (6 feet in diameter)

Magnetic materials set in concrete

Pipes

Diameter: 3-4 inches	Diameter: 6-10 inches
Steel	Steel
Plastic	Plastic
	Cast iron

The materials will be buried in pit-run gravel, which is mainly outwash. Some sites will include washed sand fill. Clay-silt till will also be incorporated.

Borehole

The stratigraphy of the proposed site is unknown, but is suspected to contain a mixture of alluvium and fill over shallow bedrock. At the site of the Mendenhall Laboratory addition, boreholes encountered till and other drift over limestone, with karst features. Two boreholes into bedrock are proposed in GEOSCAPE ONE for geophysical measurements.

Similar Geophysical Parks

The geophysical test range site for Ohio State's geologic park is based on similar designs by the University of Western Ontario (UWO, 1997) and a proposed site at the University of Leichester (UL, 199-). The sites differ in spatial context and geologic setting. The aim of each is to provide a known setting of buried masses and bedrock stratigraphy for geophysical study using ground penetrating radar, magnetic, gravity, resistivity, and electromagnetic profiling equipment.

Hydrogeology

The objectives at this site will be to measure the depth to the water table at several monitoring wells, construct surficial and bedrock water-table maps, determine flow direction, monitor water quality, and establish aquifer characteristics through slug tests in the bedrock aquifer (fig.29).

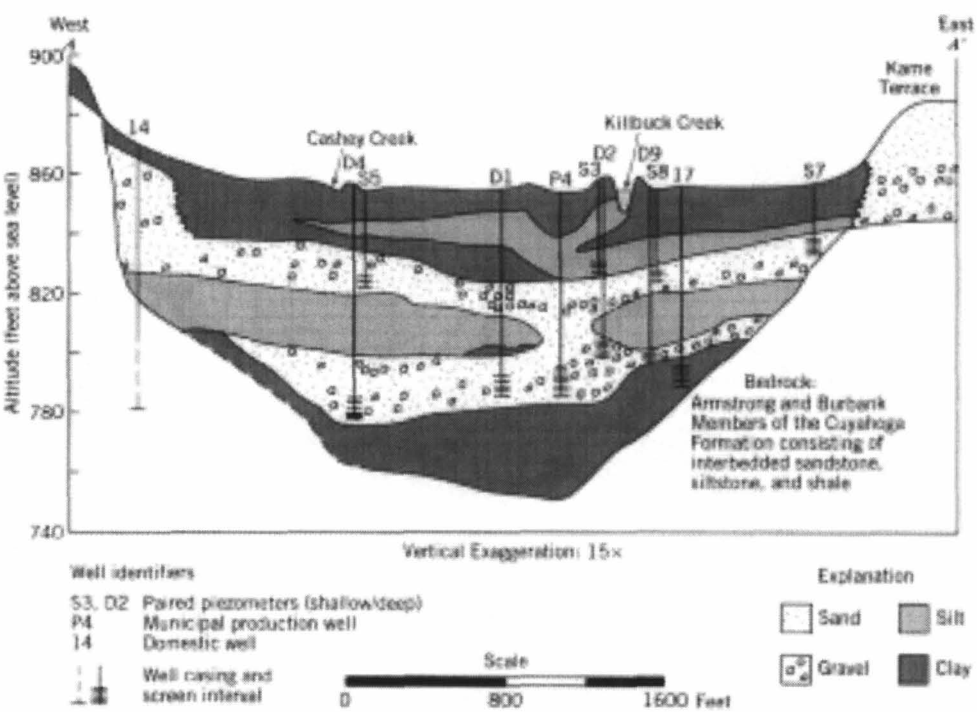


figure 29 - Example of Surficial & Bedrock Monitoring Wells

Surficial Aquifer

Four or five shallow monitoring wells (three inches in diameter) will be installed at various depths within the surficial aquifer. These wells can also be used to monitor the response of the surficial aquifer to pumping in the bedrock aquifer.

Bedrock Aquifer

For the bedrock aquifer, one six-inch diameter well and two three inch diameter wells cased a few feet into the limestone bedrock are needed to perform pumping test and stress measurements. The six inch well will also be used for geophysical measurements. The two additional bedrock wells (3 inches in diameter) will be needed for observation. Two other wells exist in the area. One near the southeast corner of the Kuhn Honors House and the other near the Browning Amphitheatre. The latter supplies Mirror Lake. Both could be used for monitoring.

A possible site for the six-inch diameter bedrock wells is the area adjacent to the east side of the Browning Amphitheatre. This will permit access by a small truck and possibly electrical power for pumping the well. It may be possible to discharge the well water into Mirror Lake during the tests. These wells would provide unobtrusive and relatively inexpensive access to groundwater studies adjacent to the Geological Sciences buildings and would be a valuable pre-field laboratory for students.

A depth to bedrock map will be completed using boreholes obtained with hand and power augers and by consulting university subsurface records, and interpretations from geophysical classes. This information will help in selecting the well and burial sites. Another data source is gamma log (USGS-WRD) that provides the bedrock stratigraphy at a site that is now under the south side of Mendenhall Lab.

Geologic Time Line

The concept of geologic time is often confusing to understand. Dealing with time over billions of years may not be comprehensible to some. Since many of the geologic processes are so gradual, an appreciation for the magnitude of geologic time is important.

The time line (fig.30) proposed for the GEOSCAPE ONE site will be along a stretch of sidewalk approximately one thousand feet long and include the scaled geologic time periods (footage representative of years). Inlaid plaques placed in the sidewalk will guide pedestrians through geologic time. Each station will contain an array of information on span of time for that period, applicable eon, epoch, and era data, mass extinction, relevant fossils, positions of the continents, paleo-environments of Ohio, and evolutionary developments. The beginning of the Precambrian can be located (off campus) to show the enormous length of this time period.

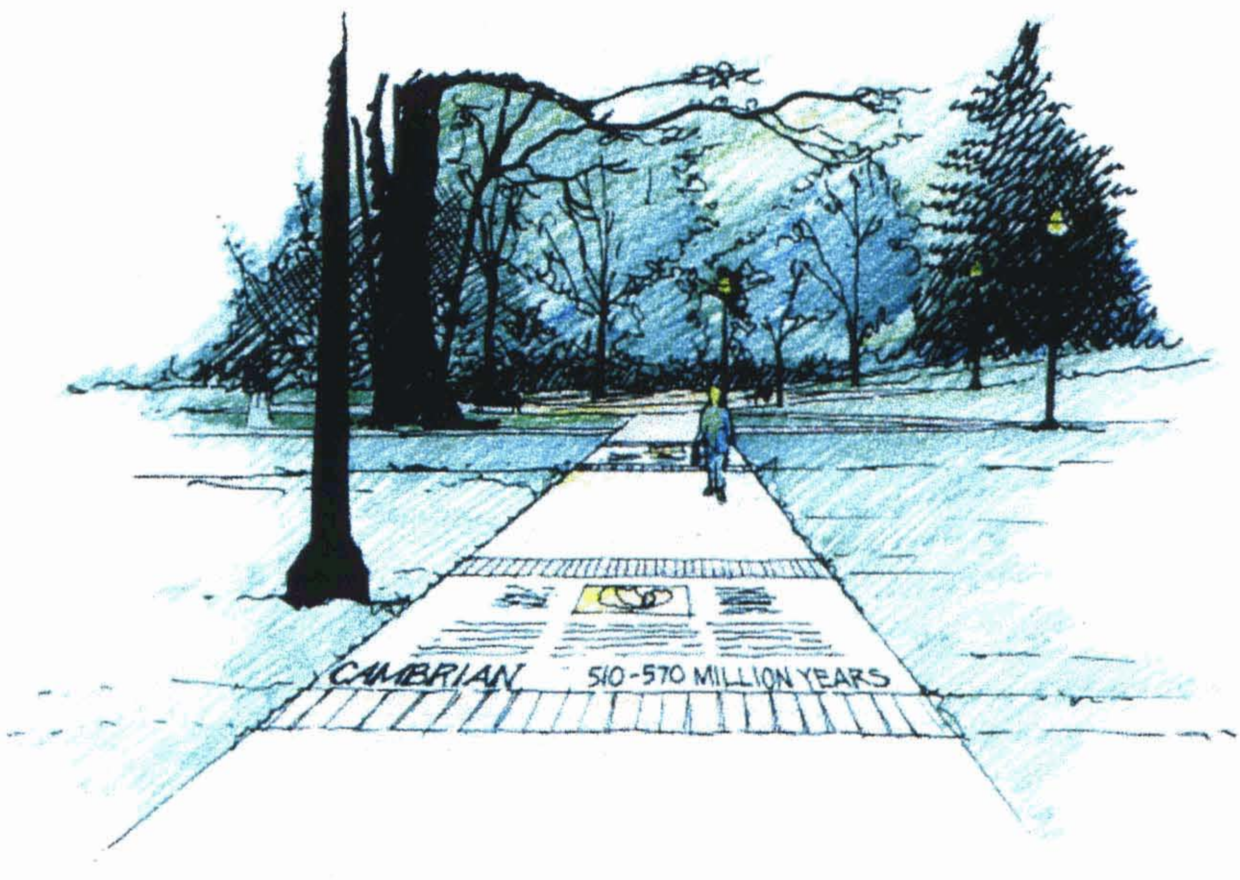


figure 30 - Sketch of Geologic Time Line

Stratigraphic Columns

Stratigraphy and sedimentology are important disciplines in geology. Sedimentology studies the classification, origin, and interpretation of sediments. Stratigraphy is more concerned with the age and correlation of strata, succession of beds, and stratigraphic and chronological sequences of bed.

figure 32 - Geologic Map of Ohio

A series of six stratigraphic columns (fig.31), representing the six geologic time periods in Ohio, is proposed around a pathway intersection on the South Oval. For each column, local competent building stones from each period will be used and placed in stratigraphic order. An inlaid plaque of the geologic map of Ohio (fig.32) will be placed in the center of the structure.

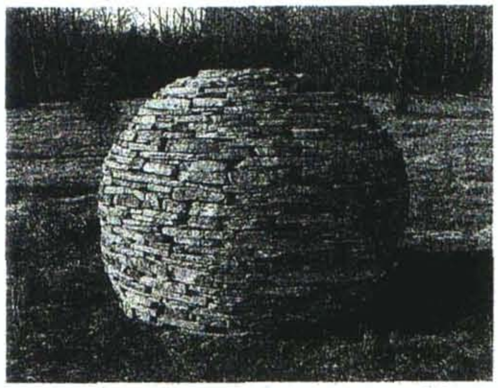


figure 33 - Sample Rock Assemblage

There are a variety of ways to show sedimentary structures and stratigraphic sequences. In the area north of Mirror Lake and south of the Main Library, there is a winding stairway that would be an ideal place to lay out assemblages of rocks to show these structures and stratigraphy. Sequences showing transgressive or regressive sequences of rock (fig. 33) could be placed in throughout the site as small scale secondary features.

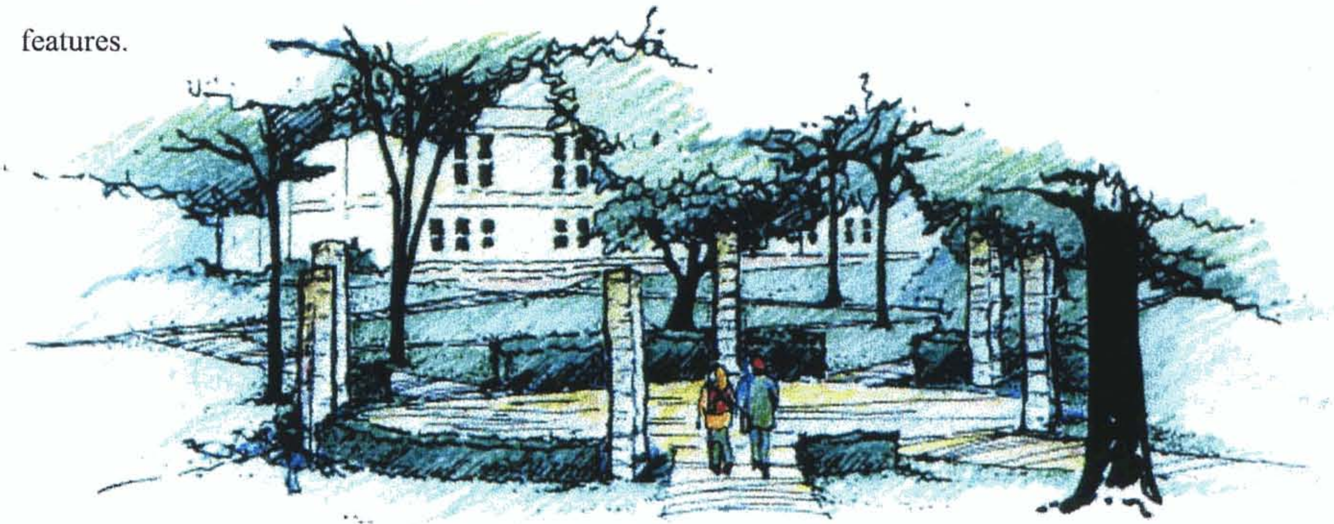


figure 31 - Sketch of Stratigraphic Columns

Memorial Rock Garden

The opportunity exists to donate a small garden (fig.34) to an alumni or faculty member as a memorial, similar to the Wheeler rock garden. The garden would include seating for relaxation and contemplation. One possible idea is to have the garden resemble a geologic map containing many different rock types, a small stream-like feature made from river rocks, intrusive dikes that could be used for seating, and well landscaped surroundings. Not only would this concept be a unique fund-raising opportunity, but would also provide solace for the overworked geologist.

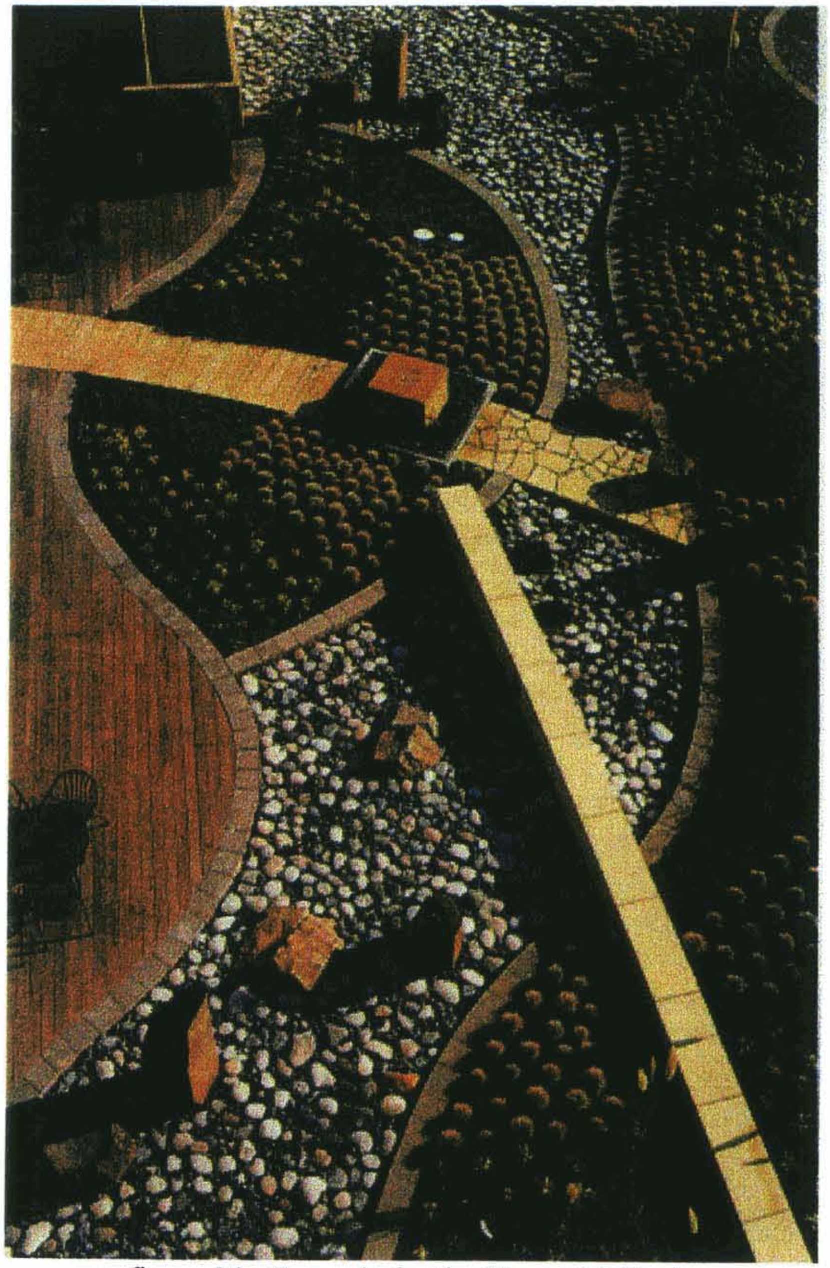


figure 34 - Example for the Memorial Garden

APPROVAL FOR GEOSCAPE ONE

Publicity

Publicity for GEOSCAPE ONE has begun through publication of the abstract for the project in the Geological Society of America's (GSA's) journal, a poster session at the North Central Section of GSA, and the production of pamphlets to be distributed by faculty at conferences. Additional publicity will be sought through continued distribution of pamphlets and solicitation of funds as the project developes.

Replication

As the project gains interest, there may be an opportunity to develop similar parks at other universities and educational facilities. One goal for this project is to develop awareness for geological education. This would be a chance to work with others with geologic interests and to gain new perspectives on the project.

Approval

This project provides great opportunity for The Ohio State University to expand its reputation as a leader in geologic education. GEOSCAPE ONE has been in the conceptual phasent for several years. The prepared program is an expansion of the traditional geologic rock garden at universities. GEOSCAPE ONE explores new otions for outdoor education that would be the model for other universities.

Approval for the plans of the proposed park rests with the various committees at The Ohio State University. Construction documents (fig. 35) and detailed plans for the park will be made available after the proposal has been accepted. A project of this scale and magnitude will need to "phased". Parts of the project will more than likely be completed in a number of phases to make financing installation more manageable. Considerations of the pre-existing utilities and current site usage have been made. The plan will not disrupt everyday activities of the South Oval. The designs for outcrops and other materials used in the park have been evaluated to keep maintenance to a minimum and access to a maximum. GEOSCAPE ONE will be a great asset to The Ohio State University and it geoscience programs.

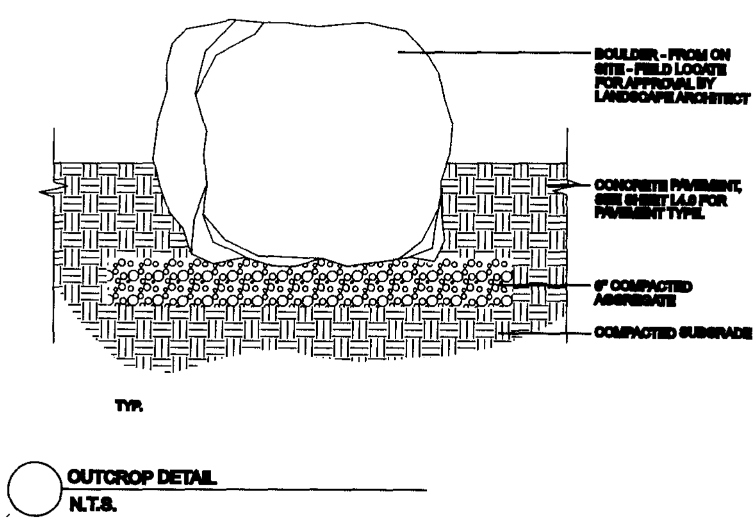


figure 35 - Construction Detail for Rock Outcrops

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